

MULTIMEDIA



UNIVERSITY

STUDENT ID NO

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MULTIMEDIA UNIVERSITY

FINAL EXAMINATION

TRIMESTER 1, 2018/2019

PBM0054 – MATHEMATICS

(Foundation in Business)

20 OCTOBER 2018

2.30 p.m. – 4.30 p.m.

(2 Hours)

INSTRUCTIONS TO STUDENT

1. This question paper consists of 3 pages with **FIVE** questions.
2. Attempt **ALL** five questions. The distribution of the marks for each question is given.
3. Please write all your answers in the answer booklet provided. All necessary workings **MUST** be shown.

Question 1

- a. Simplify the expression $\frac{\frac{3}{x+2} - 4}{\frac{2}{x+2} + 1}$. (3 marks)
- b. Simplify the expressions. Leave your answers in surd form ($\sqrt{\quad}$).
- i. $\sqrt[3]{16x^4} - 2\sqrt[3]{128x^4}$ (3 marks)
- ii. $3\sqrt{27x} - 4\sqrt{48x} + 2\sqrt{3x}$ (3 marks)
- c. Rationalize the denominator for $\frac{\sqrt{5}}{\sqrt{2} + \sqrt{3}}$. (3 marks)
- d. Find the value of x in the following equation:
 $2^{-3x-9} = \sqrt{64^{(2x+3)}}$ (4 marks)
- e. Given $(2r, 3k)$ is the solution for simultaneous equation of $3x - 4y = 12$ and $3x^2 + 8y^2 = 10xy$. Find the values of r and k . (6 marks)
- f. Find the vertex of the parabola with an equation $y = x^2 - 2x - 3$. (3 marks)

(Total = 25 marks)

Question 2

- a. Solve for
- i. $\log_3(2x-1) = 2$ (2 marks)
- ii. $\log(7x-3) + 2\log 5 = 2 + \log(x+3)$ (5 marks)
- b. Use the substitution $u = 3^x$ to solve the equation $3(3^x) + \frac{3^2}{3^x} = 28$. (5 marks)

(Total = 12 marks)

Continued...

Question 3

Solve the following system of linear equations using the inverse of coefficient matrix.

$$2x + 4z = 1 - 3y$$

$$4x + 3y + 3 = -z$$

$$x + 2y = 3 - 4z$$

(13 marks)

(Total = 13 marks)

Question 4

a. Differentiate the following functions with respect to x . Simplify the answers.

i. $y = -4x^3 - \frac{x}{3x^5} + \frac{5}{\sqrt[5]{x^{10}}} - 2$ (3 marks)

ii. $y = 2\left(\sqrt[3]{x^2 - 4}\right)^{3/2}$ (3 marks)

iii. $y = \frac{3x^3 - 5}{(2x - 1)^4}$ (5 marks)

b. Given the curve $y = \frac{6}{x}$.

i. Find the gradient, $\frac{dy}{dx}$ for this curve. (1 mark)

ii. Find 2 points on the lines which are tangent to the curve and are parallel to the line $6x + 4y - 5 = 0$. (5 marks)

iii. Hence, find the **equations** of these tangent lines. (4 marks)

c. If $y = (2t)^3$ and, $t = \sqrt{x}$, find $\frac{dy}{dx}$. (4 marks)

(Total = 25 marks)

Continued...

Question 5

a. Integrate each of the following integral.

i. $\int \frac{1}{4} x^{-2} \left(x^2 - \frac{5}{\sqrt[3]{x^2}} + \frac{1}{2\sqrt{x}} \right) dx$ (5 marks)

ii. $\int \frac{8x^6 - 125}{(2x^2 - 5)} dx$ (5 marks)

iii. $\int_0^1 5x \sqrt{x^2 + 3} dx$ (7 marks)

b. A firm has the marginal profit function of

$$\frac{dP}{dx} = \frac{9000 - 3000x}{(x^2 - 6x + 10)^2}.$$

Find the total profit function, $P(x)$ given that $P(x) = 1500$ at $x = 4$. (8 marks)

(Total = 25 marks)

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